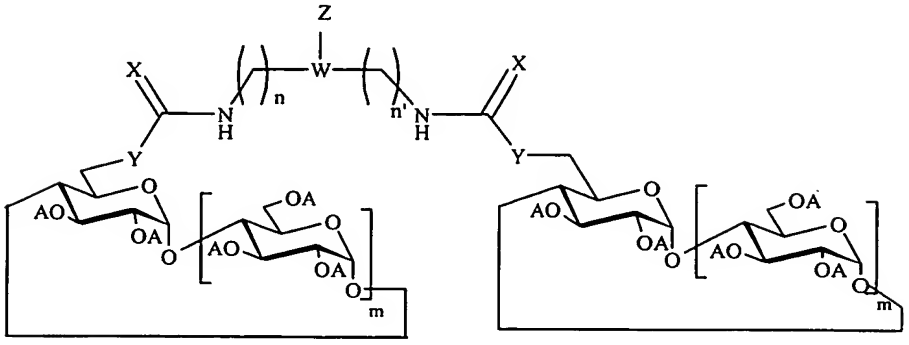
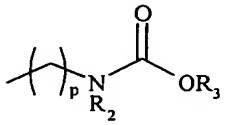
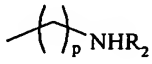
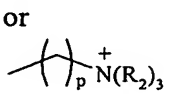
CLAIMS

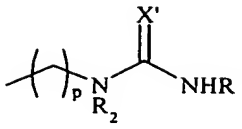
1. Compound corresponding to the following general formula:

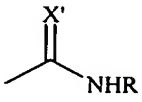


(I)

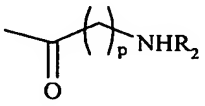
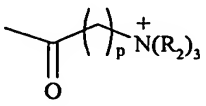
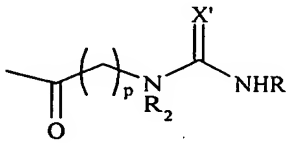
in which:

- m represents an integer equal to 5, 6 or 7;
- n and n' represent an integer from 1 to 5, n and n' being able to be identical or different;
- the A groups, identical or different, represent a hydrogen atom, an acyl, alkyl, hydroxyalkyl or sulphoalkyl group of 1 to 16 carbon atoms,
- X represents O or S,
- Y represents:
  * an $-NR_1-$ group, R_1 representing a hydrogen atom or an alkyl group comprising from 1 to 6 carbon atoms, or
  * an amide group of formula $-NH-CO-(CH_2)_q-NR_1-$, q representing an integer from 1 to 5 and R_1 being as defined above, or
  * a cysteaminyl group of formula $-S-(CH_2)_r-NR_1-$, r representing an integer from 2 to 5 and R_1 being as defined above,
- W represents CH or N;
- Z represents:
  * a hydrogen atom or
  * a carbamate substituent of formula  or
  * an amine substituent of formula  or
  * a quaternary ammonium group of formula  or

* a urea or thiourea substituent of formula  or

* a group of formula  or

* a group of the form $C(=O)OR_3$, a group of the form $C(=O)R_2$ or a group carrying the amine, ammonium quaternary urea or thiourea functionalities, of respective formulae

p representing an integer from 0 to 5, when W represents CH,
and from 2 to 5, when W represents N,

X' representing O or S,

R_2 representing a hydrogen atom or an alkyl group comprising from 1 to 6 carbon atoms, and being in particular a methyl, ethyl, propyl or butyl group,

R_3 representing a substituent allowing the hydrolysis of the carbamate group in order to release the amine function, such as the *tert*-butyl, 9-fluorenylmethyl, benzyl, allyl or 2,2,2-trichloroethyl groups, and

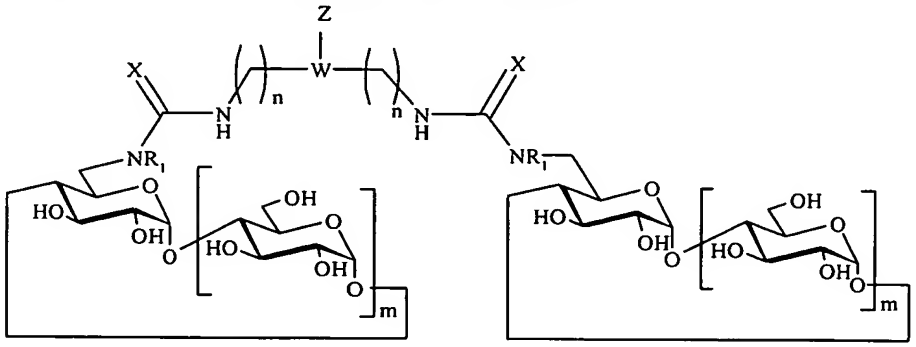
R representing a hydrogen atom, a linear or branched alkyl group of 1 to 12 carbon atoms, or an aromatic group such as the phenyl, benzyl or naphthyl group, or derivatives of these groups carrying substituents on the aromatic ring such as the methyl, ethyl, chlorine, bromine, iodine, nitro, hydroxyl, methoxyl or acetamido substituents, or

R representing a biological recognition element such as an amino acid derivative, a peptide, a monosaccharide, an oligosaccharide, a multiplication element with several branchings, which branchings comprise glucide groups which can be identical or different, or also a fluorescent or radioactive visualization or detection probe.

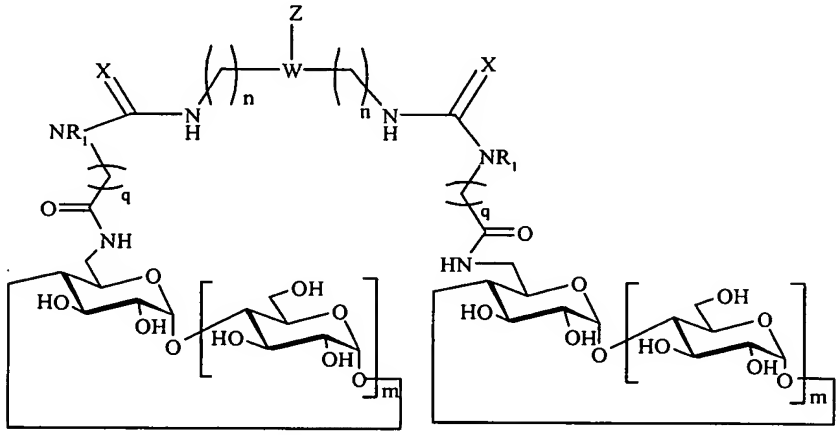
2. Compound according to claim 1, characterized in that n and n' are equal.

3. Compound according to claim 1 or 2, characterized in that all the A groups represent a hydrogen atom.

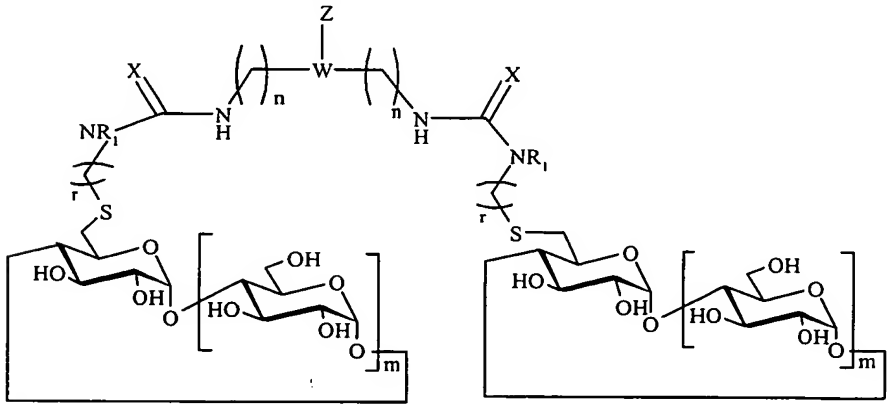
4. Compound according to claim 3, characterized in that Y represents either an NR_1 group, or an $-NH-CO-(CH_2)_q-NR_1-$ group, or an $-S-(CH_2)_r-NR_1-$ group, and corresponding to one of the following formulae respectively:



(I-a)

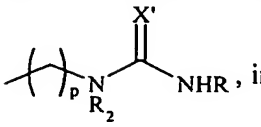


(I-b)

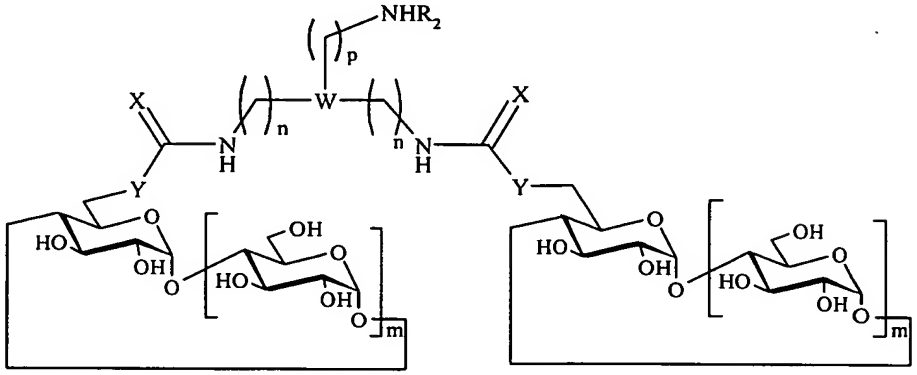


(I-c)

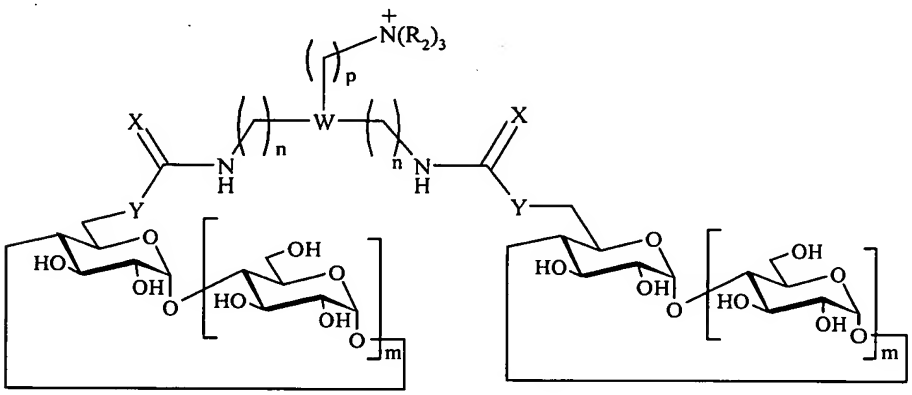
in which n, m, q, r, X, W, Z and R_1 are as defined in claim 1.

5. Compound according to claim 3 or 4, characterized in that Z represents either a $-(CH_2)_p-NHR_2$ group, or a $-(CH_2)_p-\overset{+}{N}(R_2)_3$ group, or a group of formula  , in which X' represents a sulphur atom,

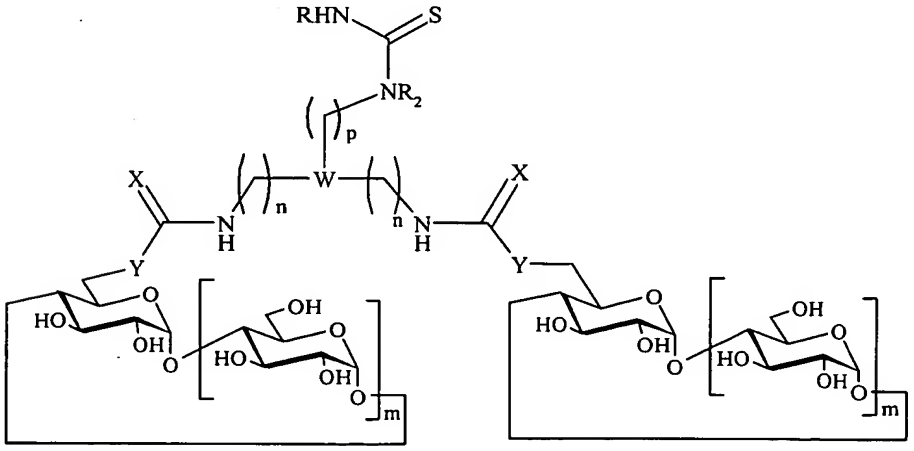
and corresponding to one of the following formulae respectively:



(I-d)

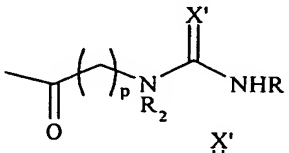
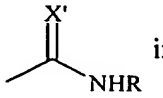


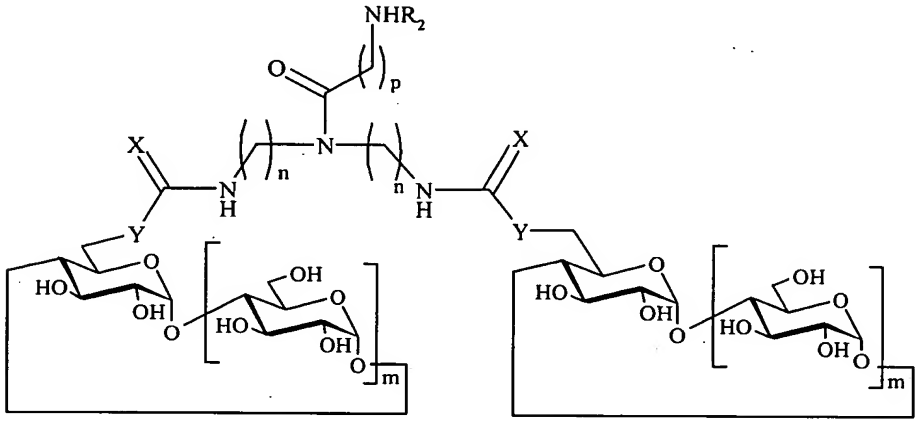
(I-e)



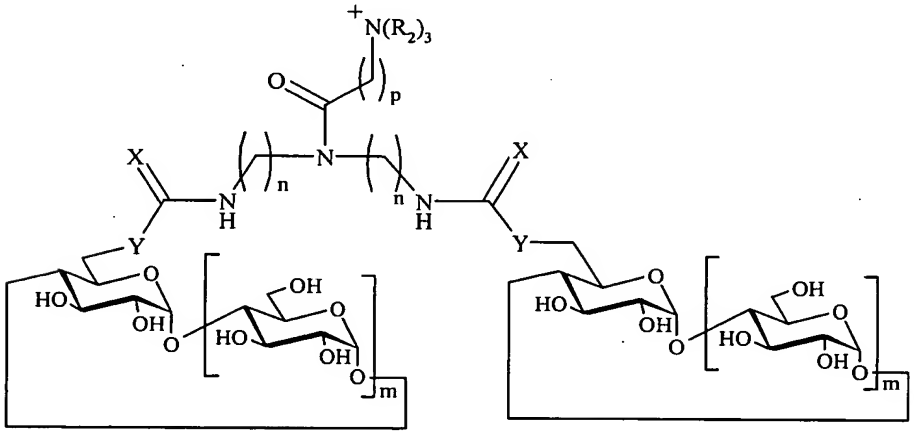
(I-f)

in which n, m, p, X, W, Y, R and R_2 are as defined in claim 1.

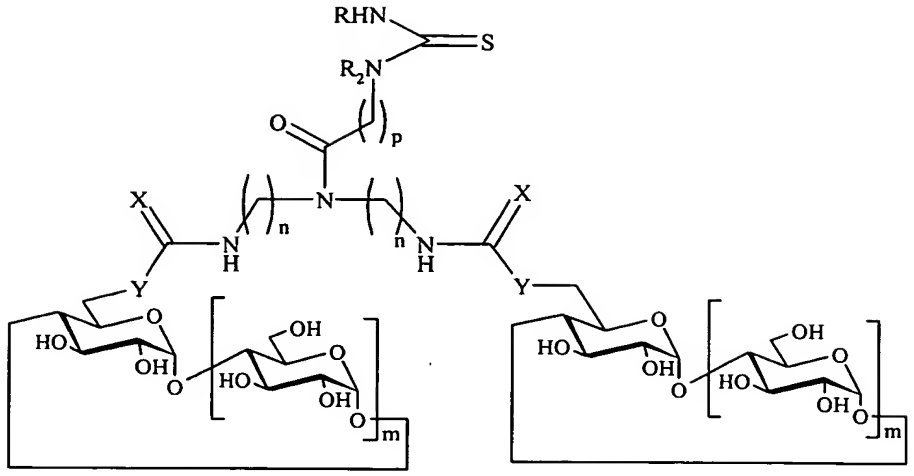
6. Compound according to any one of claims 3 to 5, characterized in that W represents a nitrogen atom and in that Z represents either a group of formula -CO-$(CH_2)_p$-NHR_2, or a group of formula -CO-$(CH_2)_p$-$N^+(R_2)_3$, or a group of formula  in which X' represents a sulphur atom, or a group of formula  in which X' represents a sulphur atom and corresponding to one of the following formulae respectively:



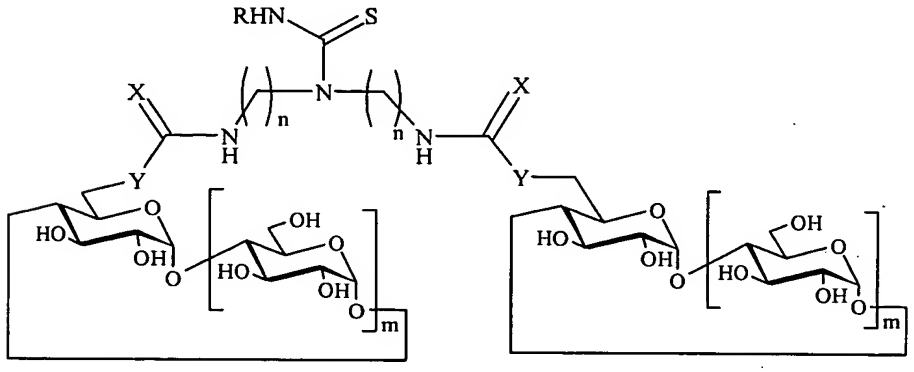
(I-g)



(I-h)



(I-i)



(I-j)

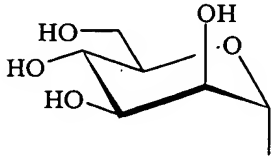
in which n, m, p, X, Y, R and R_2 are as defined in claim 1.

7. Compound according to any one of claims 1 to 6, characterized in that R is chosen from the following groups:

– an alkyl group of 1 to 12 carbon atoms, linear or branched, and preferably being the methyl group;

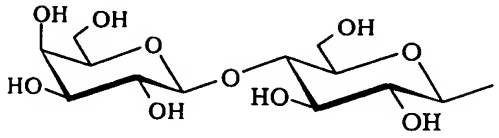
– an aromatic group such as phenyl, benzyl, naphthyl or derivatives of these groups carrying substituents on the aromatic ring, and preferably being the phenyl group;

– the α-D-mannopyranosyl group, of the following formula (III):



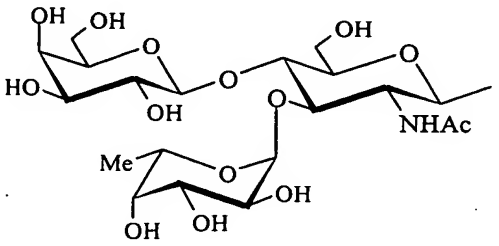
(III)

– the β-lactosyl group, of the following formula (III-a):

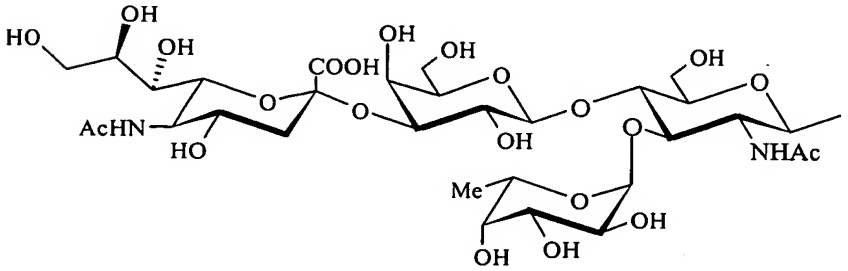


(III-a)

– the group derived from Lewis X trisaccharide or from sialyl Lewis X tetrasaccharide, of the following formulae (III-b) and (III-c) respectively:

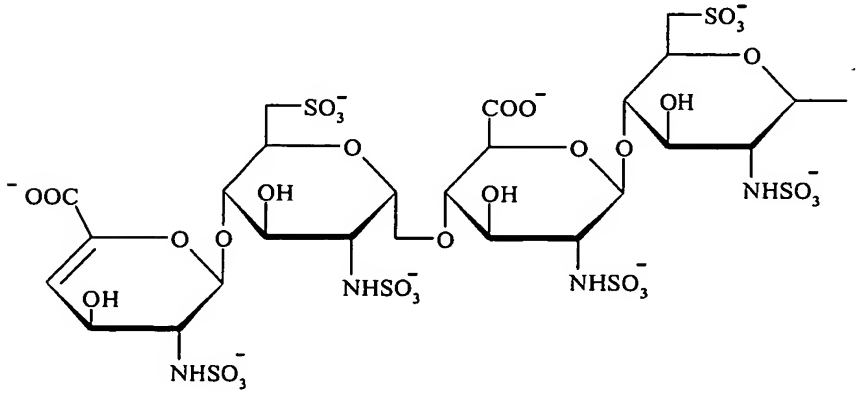


(III-b)



(III-c)

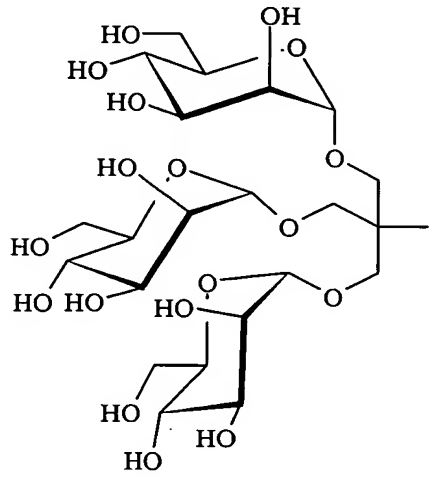
– an oligosaccharide derived from heparin, of the following formula (III-d):



(III-d)

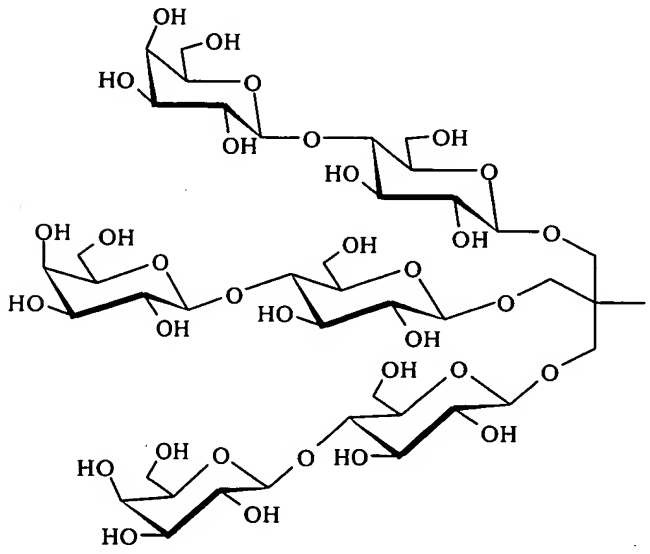
8. Compound according to any one of claims 1 to 6, characterized in that R comprises a branching element derived from tris(2-hydroxymethyl)methylamine, and represents one of the following groups:

– the tris(α-D-mannopyranosyloxymethyl)methyl group, of the following formula (IV):



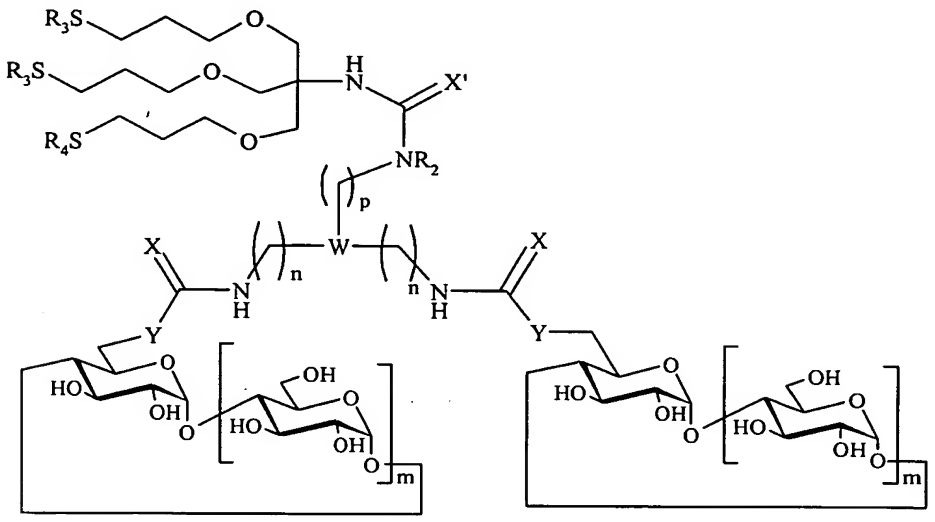
(IV)

– the tris(β-lactosyloxymethyl)methyl group, of the following formula (IV-a):

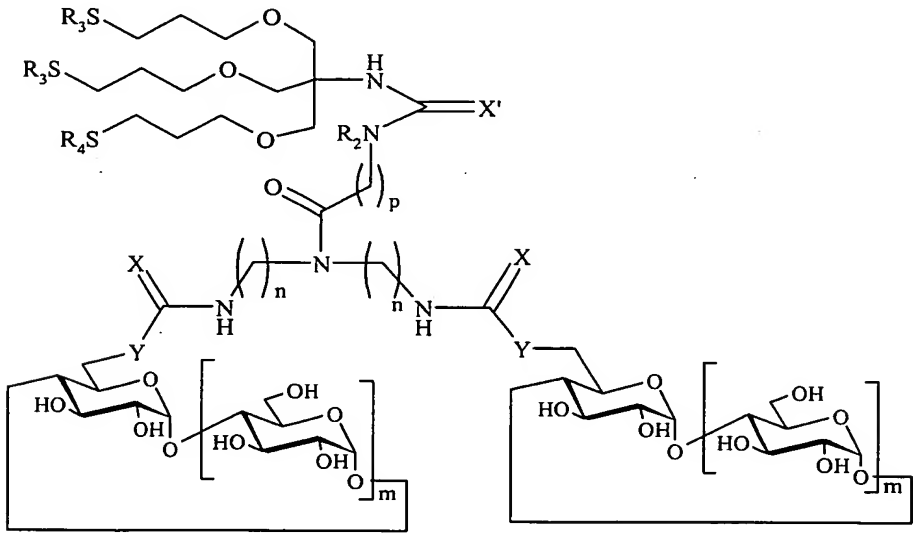


(IV-a)

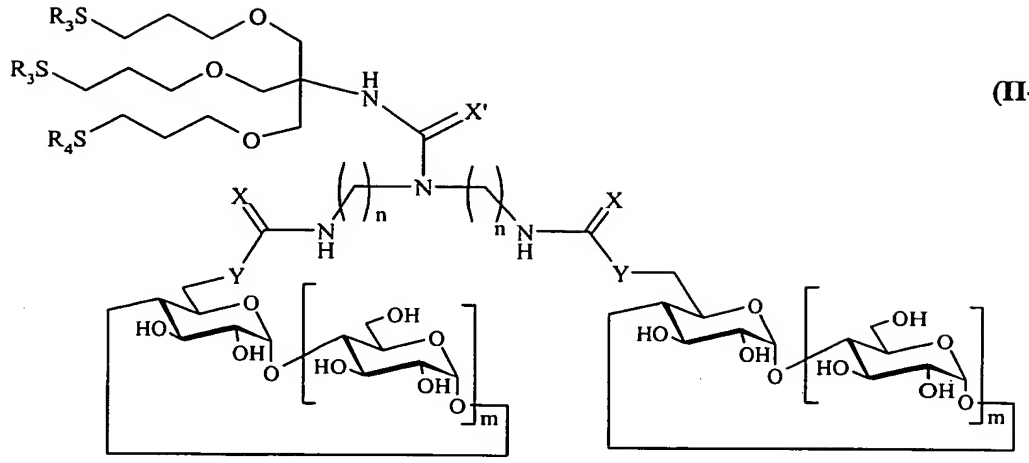
9. Compound according to any one of claims 1 to 6, characterized in that R comprises a branching element derived from pentaerythritol, said compound corresponding to one of the following formulae:



(II-a)



(II-b)



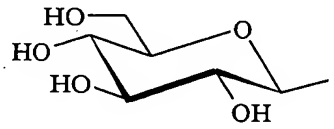
(II-c)

in which m, n, p, X, X', Y are as defined in claim 1, and

R_3 and R_4 represent glucide derivatives which can be different or identical or also a fluorescent or radioactive probe.

10. Compound according to claim 9, characterized in that R_3 and R_4 represent one of the following groups:

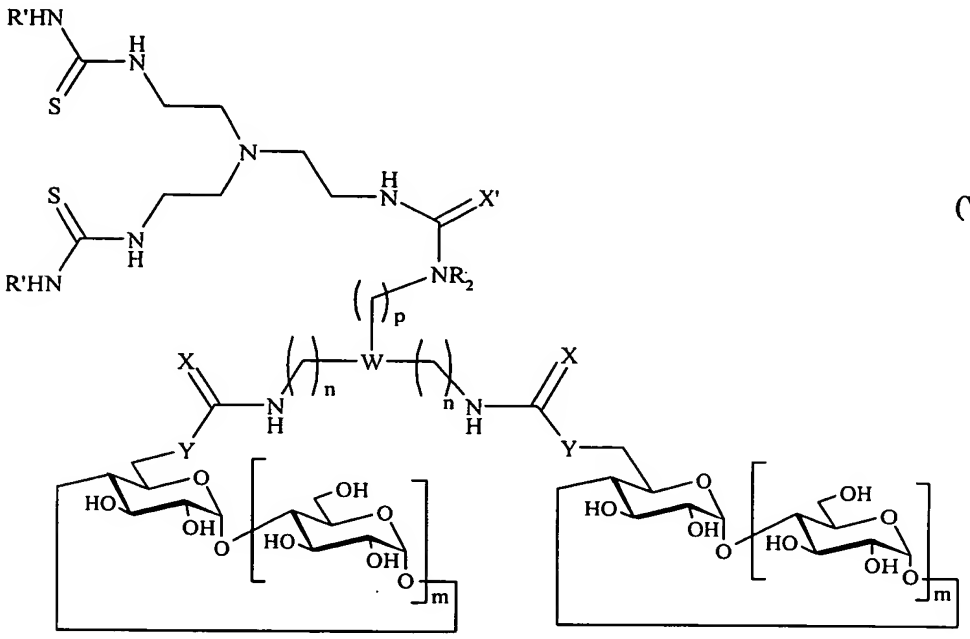
- the α-D-mannopyranosyl group, of formula (III) as defined in claim 7, or
- the β-lactosyl group, of formula (III-a) as defined in claim 7, or
- the β-D-glucopyranosyl group, of the following formula (VI):



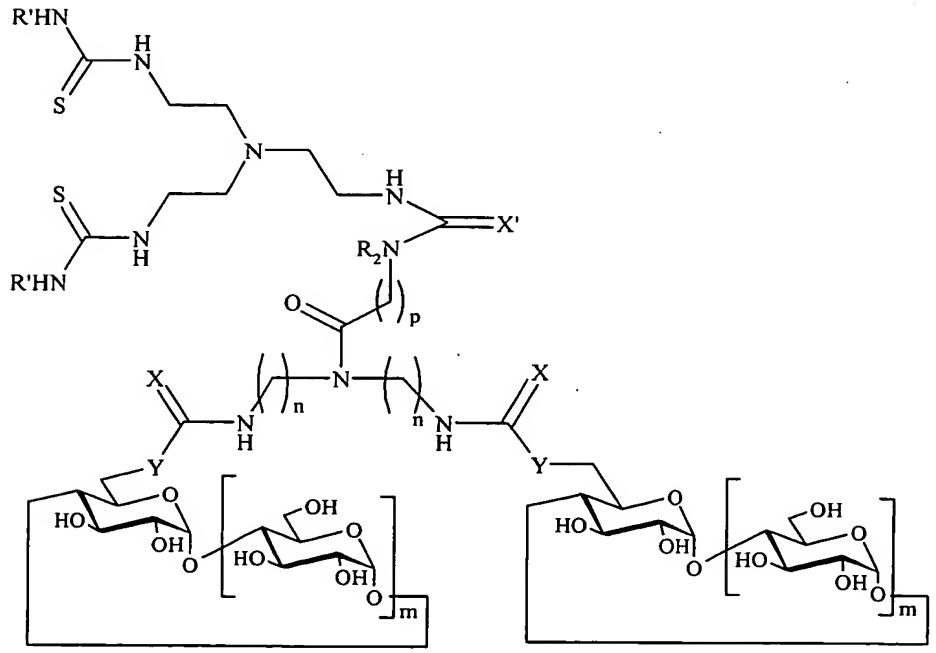
(VI)

R^3 and R^4 being able to be identical or different.

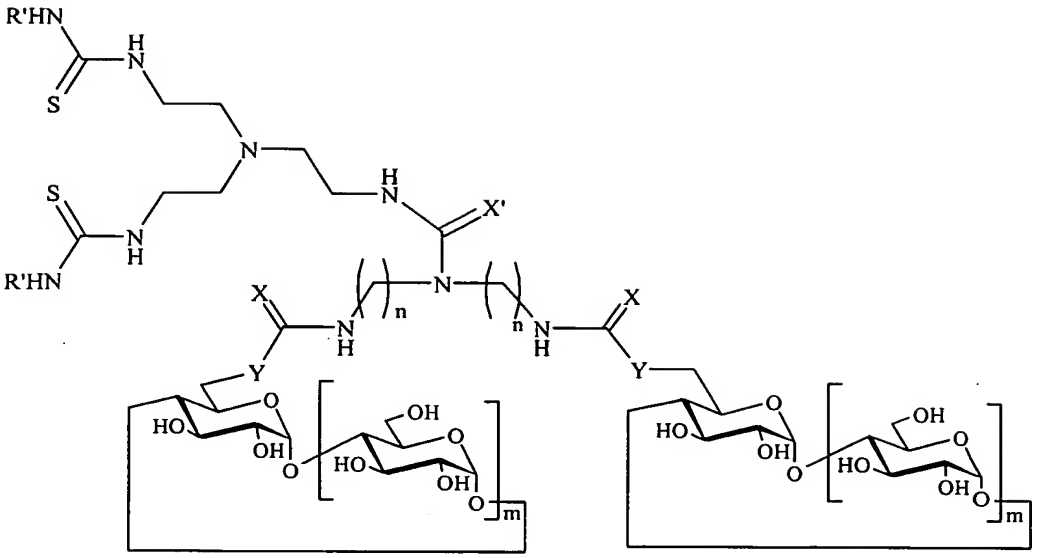
11. Compound according to any one of claims 1 to 6, characterized in that R comprises a branching element derived from tris(2-aminoethyl)amine (TREN), said compound corresponding to one of the following formulae:



(V-a)



(V-b)



(V-c)

m, n, p, X, X', Y being as defined in claim 1, and

R' having the definition given previously for R.

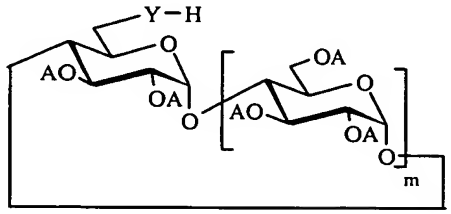
12. Compound according to claim 11, characterized in that R' represents

- the α-D-mannopyranosyl group, of formula (III), or
- the β-lactosyl group of formula (III-a), or
- the tris(α-D-mannopyranosyloxymethyl)methyl group, of formula (IV), or
- the tris(β-lactyloxymethyl)methyl group, of formula (IV-a).

13. Compound according to one of claims 1 to 12, characterized in that m is equal to 6.

14. Method for preparing a compound according to claim 1, characterized in that it comprises the following stages:

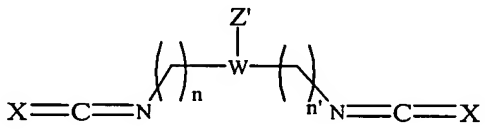
– the reaction of a compound selectively functionalized in primary alcohol position with an amine group, of the following formula (VII):



(VII)

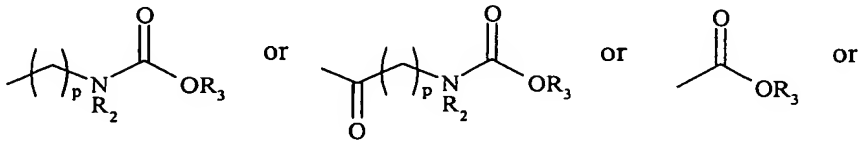
. m, A and Y being as defined previously in claim 1, and A preferably being a hydrogen atom,

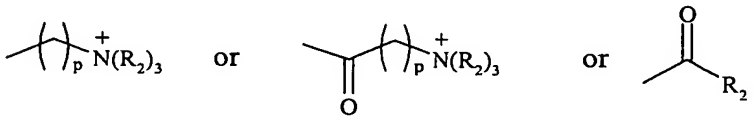
with a dimerization element of diisocyanate or diisothiocyanate type, in particular carrying a protected amine functionality in the form of a carbamate group or carrying a positively charged quaternary ammonium salt functionality, of the following formula (VIII):



(VIII)

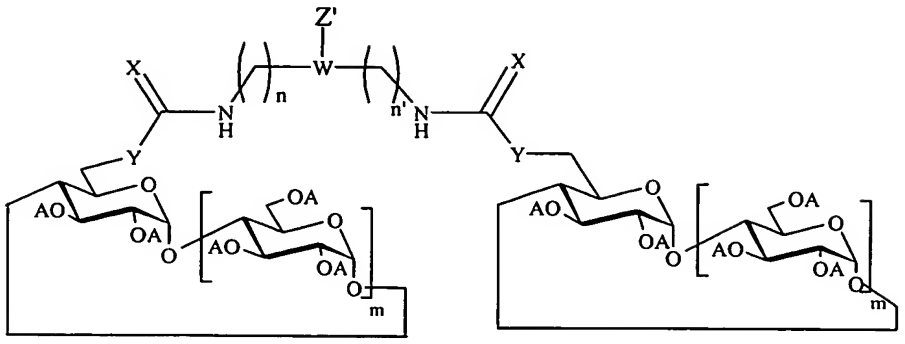
* n and n' being as defined previously in claim 1, and preferably being equal,
* W and X being as defined in claim 1,
* Z' representing a group corresponding to one of the following formulae:



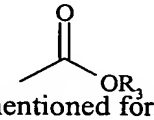


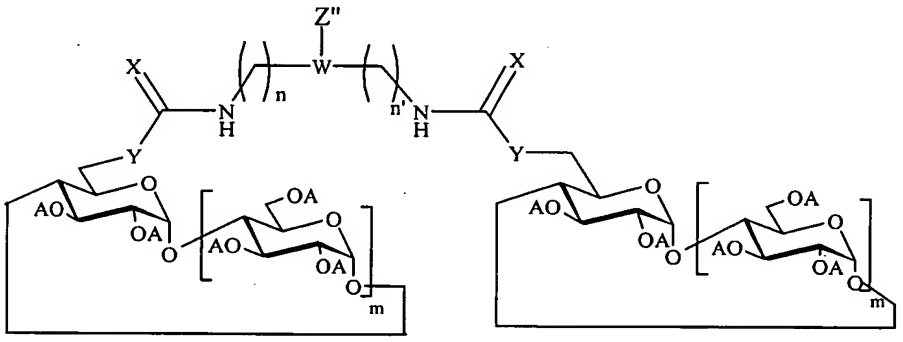
p, R_2 and R_3 being as defined in claim 1,

in order to obtain a compound according to claim 1, corresponding to the following formula (IX):



(IX)

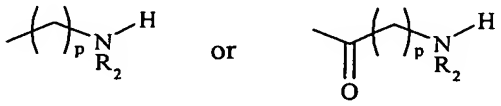
– and optionally the hydrolysis reaction of the  group as defined above, present in the compounds of the abovementioned formula (IX), in which Z' contains such a group, in order to obtain a compound carrying a free amine functionality and corresponding to the following formula (X):



(X)

* n, n,' A, X, Y, W and m being as defined previously, and

* Z'' corresponding to the hydrolysate of the Z' group containing a -$COOR_3$ function, and representing a hydrogen atom or corresponding to one of the following formulae:



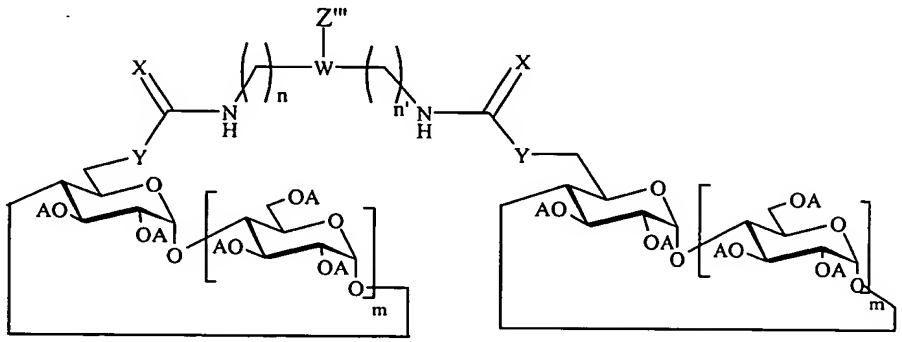
p and R_2 being as defined in claim 1,

– and optionally the reaction of a compound of formula (X) as obtained in the preceding stage, with an isocyanate or an isothiocyanate of the following formula (XI):

$$R—N=C=X'$$

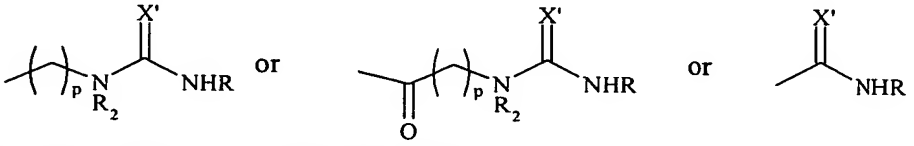
R and X' being as defined in claim 1,

in order to obtain a compound according to claim 1 corresponding to the following formula (XII):



(XII)

* n, n,' A, X, Y, W and m being as defined previously, and
* Z''' corresponding to one of the following formulae:



p, R_2, X' and R being as defined in claim 1.

15. Inclusion complex of a compound according to any one of claims 1 to 13, with a pharmacologically active molecule, the molar ratio between the compound according to one of claims 1 to 13 and the pharmacologically active molecule being approximately 10:1 to approximately 1:2.

16. Complex according to claim 15, characterized in that the pharmacologically active molecule is a ditopic molecule, capable of interacting simultaneously with two cyclodextrin sub-units, such as a molecule having two aromatic rings, such as for example a Taxol derivative, or a sufficiently large size, such as for example a steroid.

17. Complex according to any one of claims 15 or 16, characterized in that the pharmacologically active molecule is an antineoplastic agent, belonging in particular to the taxol family.

18. Pharmaceutical composition comprising a compound according to any one of claims 1 to 13, or an inclusion complex according to one of claims 15 to 17, with a pharmacologically acceptable vehicle.

19. Pharmaceutical composition according to claim 18, in the form of aqueous solution.

20. Pharmaceutical composition according to any one of claims 18 or 19, characterized in that it contains per unit dose approximately 50 mg to approximately 500 mg of one of the compounds according to any one of claims 1 to 13, or in that it contains per unit dose approximately 100 mg to approximately 750 mg of one of the complexes according to one of claims 15 to 17.